MASSACHUSETTS

Its RESEARCH & DEVELOPMENT facilities lead the nation in innovation and investment dollars.

What does it take to grow a thriving business with product innovations, technological superiority and a highly skilled workforce?

Not yesterday's knowledge or even todoy's knowledge...but tomorrow's knowledge.

Industry leadership is bosed on proven reseorch, sophisticated product development, ond morket-savvy analysis.

And to profit from this knowledge, you need immediate access to odvonced resources, professional expertise, and mutually profitoble portnerships.

Performance Statistics Highlights

Massachusetts is #1 in patents per capita of the Leading Technology States (LTS).

Key indicators of inventive thinking, new patents lead to advances in established industries and the formation of new areas of scientific, corporate and economic growth.

Massachusetts ranks above the six other leading technology states in patents per capita. In 1998, Massachusetts was granted 56 patents per 100,000 residents as compared to 48 per 100,000 for California, 35 per 100,000 in New York and 28 per 100,000 in Texas.[1]

Corporate R&D spending per employee has grown 51% in inflation-adjusted terms from 1988 to 1998 among Massachusetts publicly traded firms.

Industry leaders in Massachusetts know the potential that R&D has to spur development of new technologies, goods and services. In the fastest growing industry segments, *R&D spending per employee* is even more intensive — $117,852 in biotechnology, $44,185 in medical products manufacturing, and $28,066 in computers and communications hardware.[2]

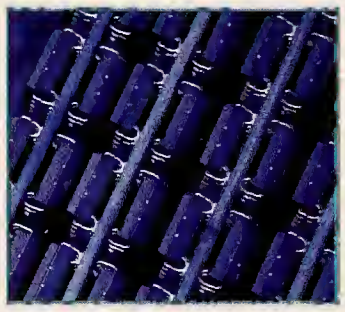
Massachusetts has the highest per capita federally funded R&D expenditures of the LTS, with the next closest, California, at 64% of the Massachusetts level.

Federal expenditures play a vital role in initiating and sustaining university and non-profit research. Expenditures for California at $138, New Jersey at $33, Texas at $38, and New York at $82 pale in comparison to $288 per capita for Massachusetts.[3]

Massachusetts leads the other LTS in Small Business Innovation Research Awards.

By providing competitive grants to entrepreneurs, the Small Business Administration rewards risk-taking and "out of the box" creativity. The dollar value of Phase I (concept research) and Phase II (development) awards for Massachusetts businesses per 100,000 people in 1997 was $2,683. This far outranked Colorado's $1,142, California's $777 and New York's $262.[4]

MASSACHUSETTS
POWERED BY INGENUITY



From the Boston-Cambridge hub to Worcester's Biotech Park to the Oceanographic Institution in Woods Hole, every region in Massachusetts has thriving university and private-sector R&D facilities that can have a profound impact on the innovation and growth of your business.

Everywhere you go in Massachusetts, the environment is conducive to research and development. And although there is an abundance of biotech, high-tech, medical, and financial R&D facilities, there are others in areas that might surprise you, such as textiles/apparel, industrial manufacturing, and environmental technologies. This list is by no means exhaustive — there are new centers being created or relocating to Massachusetts all the time.

BOSTON *Region*

By starting in Boston and "touring" each region, you can get a sense of the depth and breadth of R&D facilities in the state.

Boston and Cambridge are home to some of the premier university-sponsored research centers in the world. **MIT, Harvard, University of Massachusetts–Boston, Northeastern, and Boston University** each has its own specializations and areas of expertise.

From mini-satellites the size of volleyballs to new cancer-detecting devices, **MIT's** scientists are engaged in a wide scope of projects. Their research centers, laboratories, and programs range from their Active Materials and Structures Laboratory to a World Wide Web Consortium.

Harvard University sponsors both global university-wide interfaculty initiatives and narrowly focused projects through its more than 120 research centers and programs. Your business may be able to benefit from the findings of the Berkman Center for Internet & Society that works to identify the challenges and opportunities of the Internet or the occupational health research from the Educational Resource Center for Occupational Safety and Health.

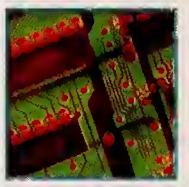
The **University of Massachusetts,** with its five campuses throughout the state, is firmly committed to helping Massachusetts firms stay competitive and to fostering new economic growth. With over $200 million of sponsored research, UMass in its most recent fiscal year presented 112 invention disclosures, secured 32 patents, completed 19 licenses and generated $5.4 million in industry-sponsored research associated with technology commercializations.

Tufts University in Boston and Medford is renowned for its Fletcher School of Law and Diplomacy and its School of Nutrition Science and Policy. And **Babson College** draws executives from around the world who want to study entrepreneurship, managing change and business leadership.

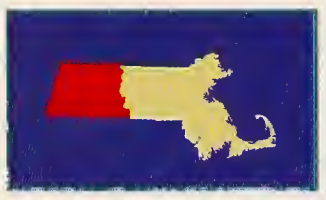
This rich R&D university environment is also fertile ground for independent research firms. Internet pioneer **GTE Internetworking/BBN,** now known as **Genuity,** led the way in advances in the Internet. The **Cyber District** in Boston is a hotbed of Internet research and startup companies.

Cambridge-based **Forrester Research, Inc.** helps hundreds of organizations analyze the impact of technology on businesses and society, the Needham-based **TowerGroup** delivers insights on the role of information technology in the financial services industry, and the **Charles Stark Draper Laboratory** focuses on engineering development and technology transfer.

Companies in the telecommunications industry will soon have a new capital of innovation in **TeleCom City**. This 200-acre site in the cities of Malden, Medford, and Everett contains office, research and manufacturing space as well as special facilities designed for entrepreneurs, multi-company collaborations and technological innovation.



WESTERN *Region*



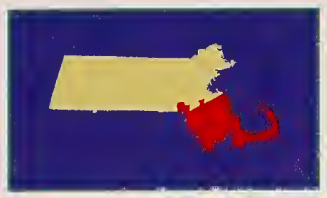
The more than 70 Centers, Institutes and Programs at UMass–Amherst have a wide span of research focus.

The core technology areas mirror those identified by the National Research Council as critical to U.S. industrial development — biotechnology, chemical and materials sciences, information and control technologies, industrial ecology/green technologies, food, life, health, and environmental sciences, telecommunications, and manufacturing.

The **Univerisity of Massachusetts** actively seeks corporate partnerships. Its office of Science and Technology Advancement fosters all aspects of industry and academic relationships — it identifies relevant research opportunities, facilitates the exchange of talent and intellectual property, and builds long-term, strategic alliances that leverage corporate resources.

For example, **Solutia, Inc.** (formerly the chemical businesses of Monsanto) needed research expertise to improve one of their products. The chemical engineers at UMass helped solve the optical defects problem in Saflex®, the leading brand of plastic interlayer for automobile safety glass.

SOUTHEAST *Region*



In addition to being a vacationers' paradise, Massachusetts coastal communities are known for their advanced marine research laboratories.

Founded in 1930, **Woods Hole Oceanographic Institution** is the largest independent oceanographic research facility in the world. Over 700 scientists, technical and support personnel and students research all areas of oceanography, from applied ocean physics and biology to geology and marine chemistry.

The **Center for Marine Science and Technology (CMAST) at** the **University of Massachusetts–Dartmouth** combines the talents of faculty in 11 departments who focus on ocean prediction and monitoring systems, fishery management science and advanced aquaculture systems. Its research is a synthesis of basic and applied science focusing on developing new knowledge, technologies and industries.

UMass–Dartmouth is also known for its superior fine-and design-arts facilities concentrating on textile design and ceramics. It has received over $500,000 annually for the past three years from the **National Textile Center** for textiles/fiber research and graduate student assistantships.

Supporting new ideas, technologies and products, the **Center for Advanced Technology and Manufacturing** is in the process of constructing a 60,000

square-foot technology center on the Kerr Mill site in Fall River. Scheduled to open in the fall of 2001, it will contain incubator space, research facilities, and a conference center for 250 people. They are looking to partner with companies in diverse areas, including environmental technologies, optics, textiles, electronic and computer design, and materials testing.

NORTHEAST *Region*

Encompassing part of the "128 Belt," the Northeast region has diverse research capabilities ranging from computers and engineering technologies to aerospace and advanced materials.

Aerodyne Research, Inc. has provided research and development services to commercial and government clients since 1970 in the areas of energy and thermal technologies, advanced materials and environmental change.

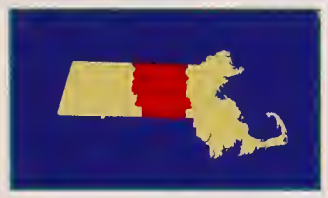
Located in Andover, **Bodycote IMT, Inc.** does basic and applied research in advanced aerospace materials, plastics and metallurgy, while **Genetics Institute's** Andover and Cambridge facilities research better ways to treat human diseases.

Charles River Laboratories of Wilmington, the largest laboratory animal production company in the world, partners with hundreds of firms that conduct medical and pharmaceutical research. The firm also has a Contract Research Services program that executes preclinical research protocols under a client's direction.

UMass–Lowell has become a thriving center for R&D with its 28 research centers and institutes covering areas such as telecommunications, advanced electronics, advanced materials, electromagnetic materials and optical systems and industrial competitiveness.

Although each center has its own area of expertise, collectively they are striving to advance basic research, serve as a knowledge base for student and industry research, and advance the industrial economy.

CENTRAL *Region*



UMass Medical School in Worcester has experienced one of the highest growth rates of funded research in the country.

A new 300,000-square-foot Research Laboratory will open in September 2001. This state-of-the-art facility will allow UMMS to continue its work in both clinical and basic science research. Its recently opened **Irving S. and Betty Brudnick Neuropsychiatric Research Institute** is dedicated to the comprehensive study and treatment of biological brain diseases.

The **Tufts University School of Veterinary Medicine** in North Grafton is world renowned for its veterinary studies and research. It is one of the few veterinary schools that studies wildlife health, and it is an authorized treatment center for the care of endangered species.

The **Natick Army Labs** is a federal facility that provides research, development, engineering, and acquisition support for soldiers in all environments. Many of the Natick Lab systems are built and supported by industry partners such as **Bose Corporation** and **Malden Mills.**

Opened in 1987, the **Massachusetts Biotechnology Research Park** in Worcester, with more than 800,000 square feet of biotechnology research and development space, is home to companies such as **Alpha Beta Technologies, Athena Diagnostics** and is the world headquarters for **BASF BioResearch Corporation.**

1 "Index of the Massachusetts Innovation Economy, 1999" prepared by Collaborative Economics and the Massachusetts Technology Collaborative Source: U.S. Patent and Trademark Office, U.S. Census Bureau
2 Ibid. Source: Compustat, Collaborative Economics 3 Ibid. Source: National Science Foundation 4 Ibid. Source: Small Business Administration

Examples of INNOVATIVE Partnerships

Three-Way Partnership Turns Ideas into Profitable Products

Twelve corporate/university entities, the Commonwealth of Massachusetts, and NASA are collaborating in a non-profit partnership called the **Center for Advanced Fiberoptic Applications (CAFA)** in Southbridge.

Established to meet the needs of manufacturers and end-users of photonic technologies, CAFA's mission is to transform ideas generated by the alliance into commercially viable products. CAFA uses the engineering and scientific strengths of the region to develop unique, high-performance solutions to problems in areas such as health care, analytical instrumentation, environmental monitoring, communications, process control, and display technology.

The 12 corporate/university participants are Aotec Inc., Bell Atlantic, CeramOptec Inc., CTC Inc., Fleet Bank, Incom Inc., Massachusetts Electric, Schott Fiber Optics Inc., Lucent/SpecTran Corp., Techman International Corp., Thermometrics Inc., and UMass.

In addition to its projects, CAFA is in the process of renovating/building a Modeling and Design Facility, Rapid Prototyping Area, and Optical Sciences Laboratory.

MBI Helps to Create 20 New Biotech Companies and More Than 2,000 New Jobs in Massachusetts

Dedicated to finding innovative new technologies and transforming them into marketable products, the **Massachusetts Biomedical Initiative (MBI)** is a vital resource for both startup and existing biomedical businesses that want to expand in Massachusetts.

MBI operates two state-of-the-art Innovation Centers in Boston and Worcester that house startup companies and provide consulting, manufacturing resources, and access to private investment capital. Its Technology Commercialization Center (TCC) offers the expertise and leadership needed to commercialize new technology.

MBI has linked nine public and private universities in a common commercialization system and has worked closely with the state to leverage $8 million in public funding and more than $55 million in new private venture capital funds for startup biomedical businesses.

The future of the biomedical industry is fueled by the efforts of MBI.

Having a Business Presence in Massachusetts – *A Wise Move*

Researchers working in collaboration with businesses often find breakthrough solutions to problems. Massachusetts' R&D facilities in every area of the state provide a continuous path from basic research to applied R&D to highly profitable products.

And whether you relocate your headquarters or open a new facility, you can take advantage of all types of research-business partnerships, from formal strategic alliances to brainstorming and golf on a Saturday afternoon.

The Massachusetts Office of Business Development can help make your relocation or expansion in Massachusetts easy and cost-effective. Our "One-Call, One-Contact" assistance puts you in touch with a Project Manager who can help you with everything from accessibility and financial resources to regulatory assistance and site selection.

Massachusetts has the resources, knowledge, and expertise that your business needs to succeed.

Massachusetts Office of Business Development

Governor
Argeo Paul Cellucci

State Transportation Building
10 Park Plaza, Suite 3720
Boston, MA 02116

Phone: (617) 973-8600
1-800-5-CAPITAL (522-7482)
Fax: (617) 973-8797

Lt. Governor
Jane Swift

www.state.ma.us/mobd